<u>Claims</u>

1   1. A method for treating a mammalian disease

2 characterized by abnormal cell mitosis, said method

3 comprising administering to a mammal a cell-mitosis-

4 inhibiting compound of the formula below, said compound

5 being administered in an amount sufficient to inhibit cell

6 mitosis:

7

8 wherein:

9   I. R_a-R_o are defined as follows:

10   A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,

11   R_m, R_o, independently is -R_1, -OR_1,

- 15 -

12    $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g

13   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,

14    $-I$, or $-C\equiv CH$;

15 or

16   B)   each R_a, R_b, R_c, R_f, R_k, R_l, R_o,

17   independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,

18    $-F$, $-NHR_2$, $-Br$, or $-I$; and each R_d, R_e, R_i,

19   R_j, R_m, independently is $=O$, $-R_1$, $-OR_1$,

20    $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$; and R_g

21   is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$,

22    $-Br$, $-I$, or $-C\equiv CH$;

23 and

24   II.   Z' is defined as follows:

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27   A)   Z' is X, where X is $>COR_1$, $>\overset{\overset{\displaystyle O}{\|}}{C}C-R_1$,

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29    $>\overset{\overset{\displaystyle O}{\|}}{C}C-OR_1$, $>\overset{\overset{\displaystyle OH}{|}}{C}C-R_1$, $>\overset{\overset{\displaystyle OH}{|}}{C}C-OR_1$;

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31 or

32   B)   Z' is $=\underset{\underset{\displaystyle R_n}{|}}{C}-X'-$ or $-X'-\underset{\underset{\displaystyle R_n}{|}}{C}=$, where R_n

33

34

35   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

36   and X' is X, as defined above; or X' is

37    $>C=O$;

38 and

39   III.   Z" is defined as follows:

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42   A)   Z" is Y, where Y is $-O-$, $-\overset{\overset{\displaystyle R_1}{|}}{N}-$, $>CHR_1$,

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45    $>C=O$, $>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n OR_2$,

$-$ 16 $-$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-OR_2$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}(CH_2)_nNH\overset{\overset{\displaystyle O}{\|}}{C}R_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH\overset{\overset{\displaystyle O}{\|}}{C}-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH-\overset{\overset{\displaystyle OH}{|}}{C}HR_2, \quad >\overset{\overset{\displaystyle R}{|}}{C}-(CH_2)_n-NH-\overset{\overset{\displaystyle OH}{|}}{C}OR_2, \quad or$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH-CH_2OR_2, \quad where\ n\ is\ 0-6;$$

or

    B) Z'' is $-Y-\overset{\overset{\displaystyle |}{C}H}{\underset{\displaystyle R_p}{}}-$ or $-\overset{\overset{\displaystyle |}{C}H}{\underset{\displaystyle R_p}{}}-Y-$ where R_p

    is $-R_1, -OR_1, -SR_1, -F, -NHR_2, -Br$ or $-I$;

and

  IV.   provided that when each R_b, R_c, R_d, R_e, R_i, R_j, R_k, R_l, R_m and R_o is H;

        R_f is $-CH_3$;

82   R_g is -OH;

83   Z' is >COH; and

84   Z" is >CH_2;

85   then R_a is not -H;

86 where, in each formula set forth above, each R_1 and R_2

87 independently is -H, or substituted or unsubstituted alkyl,

88 alkenyl or alkynl group of 1-6 carbons.

1   2. A method for treating a mammalian disease

2 characterized by abnormal cell mitosis, said method

3 comprising administering to a mammal a cell-mitosis-

4 inhibiting compound of the formula below, said compound

5 being administered in an amount sufficient to inhibit cell

6 mitosis:

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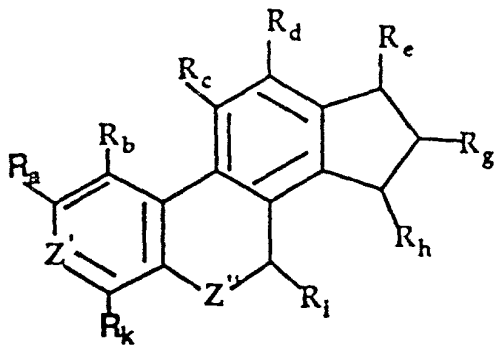
8 wherein:

9   I. R_a–R_k are defined as follows:

10   A)   each R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k

11   independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,

12                  $-F$, $-NHR_2$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,

13                  $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

14 or

15   B)   each R_a, R_b, R_c, R_d, R_k, independently is

16                  $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or

17                  $-I$; and each R_{eg}, R_h, R_i, independently is

18                  $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, or

19                  $-I$; and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,

20                  $-F$, $-Br$, $-I$ or $-C\equiv CH$;

21 and

22   II. Z' is defined as follows:

23-25   A) Z' is X, where X is $>COR_1$, $>\overset{\displaystyle O}{\overset{\|}{C}}C-R_1$,

26-28 $>\overset{\displaystyle O}{\overset{\|}{C}}C-OR_1$, $>\overset{\displaystyle OH}{\overset{|}{C}}C-R_1$, $>\overset{\displaystyle OH}{\overset{|}{C}}-C-OR_1$;

29 or

30-32   B) Z' is $=\underset{\displaystyle R_n}{\overset{|}{C}}-X'-$ or $-X'-\underset{\displaystyle R_n}{\overset{|}{C}}=$, where R_n

33   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,

34   and X' is X, as defined above;

35   or X' is also $>C=O$;

36 and

37   III. Z'' is defined as follows:

38-40   A) Z'' is Y, where Y is $-O-$, $-\overset{\displaystyle R_1}{\overset{|}{N}}-$, $>CHR_1$,

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$$>C=O, \quad >\underset{|}{\overset{R_1}{C}}-(CH_2)_nOR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-(CH_2)_n-\overset{O}{\overset{\|}{C}}R_2, \quad >\underset{|}{\overset{R_1}{C}}-(CH_2)_n-\overset{O}{\overset{\|}{C}}-OR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-(CH_2)_n-\overset{OH}{\overset{|}{C}}HR_2, \quad >\underset{|}{\overset{R_1}{C}}-(CH_2)_n-\overset{OH}{\overset{|}{C}}H-OR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-\overset{O}{\overset{\|}{C}}R_2, \quad >\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-\overset{OH}{\overset{|}{C}}HR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-\overset{OH}{\overset{|}{C}}H-OR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-\overset{O}{\overset{\|}{C}}-OR_2, \quad >\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-OR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-NH(CH_2)_n-R_2,$$

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$$>\underset{|}{\overset{R_1}{C}}(CH_2)_nNH\overset{O}{\overset{\|}{C}}R_2, \quad >\underset{|}{\overset{R_1}{C}}-(CH_2)_n-NH\overset{O}{\overset{\|}{C}}-OR_2,$$

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$$>\underset{|}{\overset{R_1}{C}}-(CH_2)_n-NH-\overset{OH}{\overset{|}{C}}HR_2, \quad >\underset{|}{\overset{R}{C}}-(CH_2)_n-NH-\overset{OH}{\overset{|}{C}}OR_2, \quad or$$

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$$>\underset{|}{\overset{R_1}{C}}-(CH_2)_n-NH-CH_2OR_2, \quad \text{where } n \text{ is } 0\text{-}6;$$

71   or

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B)   Z" is $-Y-\underset{|}{\overset{}{C}}H-$ or $-\underset{|}{\overset{}{C}}H-Y-$, where R_p is
R_pR_p
$-R_1, \quad -OR_1, \quad -SR_1, \quad -F, \quad -NHR_2, \quad -Br \text{ or } -I;$

76   where, in each formula set forth above, each R_1 and R_2

77   independently is -H, or substituted or unsubstituted alkyl,

78   alkenyl or alkynl group of 1-6 carbons.

1   3. A method for treating a mammalian disease

2   characterized by abnormal cell mitosis, said method

3   comprising administering to a mammal a cell-mitosis-

4   inhibiting compound of the formula below, said compound

5   being administered in an amount sufficient to inhibit cell

6   mitosis:

7
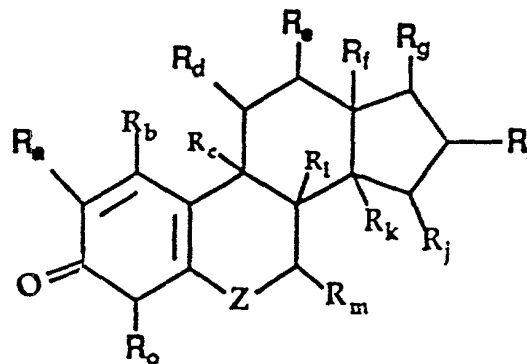
8   wherein:

9   I. R_a-R_o are defined as follows:

10   A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,

11   R_m, R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,

12               $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $-R_1$,

13               $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or

14               $-C{\equiv}CH$;

15   or

16   B)   each R_a, R_b, R_c, R_f, R_k, R_l, independently

17   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,

18   or $-I$; and each R_d, R_e, R_i, R_j, R_m, R_o

19   independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,

20                      $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $=O$,

21                      $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$

22   or $-C\equiv CH$;

23   and

24   II.   Z is defined as follows:

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27   A)   Z is Y, where Y is $-O-$, $-N-$, $>CHR_1$,

$$>C=O, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-OR_2,$$

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$$>\overset{\overset{\displaystyle R_1}{\vert}}{C}\text{-NH(CH}_2)_n\text{-R}_2,$$

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$$>\overset{\overset{\displaystyle R_1}{\vert}}{C}\text{-(CH}_2)_n\text{-NH}\overset{\overset{\displaystyle O}{\Vert}}{C}\text{-OR}_2, \quad >\overset{\overset{\displaystyle R_1}{\vert}}{C}\text{(CH}_2)_n\text{NH}\overset{\overset{\displaystyle O}{\Vert}}{C}\text{R}_2,$$

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$$>\overset{\overset{\displaystyle R_1}{\vert}}{C}\text{-(CH}_2)_n\text{-NH-}\overset{\overset{\displaystyle OH}{\vert}}{C}\text{HR}_2, \quad >\overset{\overset{\displaystyle R}{\vert}}{C}\text{-(CH}_2)_n\text{-NH-}\overset{\overset{\displaystyle OH}{\vert}}{C}\text{OR}_2, \text{ or}$$

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$$>\overset{\overset{\displaystyle R_1}{\vert}}{C}\text{-(CH}_2)_n\text{-NH-CH}_2\text{OR}_2, \text{ where n is 0-6;}$$

62   or

63   B)   Z is $-\text{Y-}\overset{\overset{}{\vert}}{\text{C}}\text{H-}$ or $-\text{C}\overset{}{\text{H-Y-}}$, where R_n
64
65   R_n R_n

66   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

67 where, in each formula set forth above, each R_1 and R_2
68 independently is $-H$, or substituted or unsubstituted alkyl,
69 alkenyl or alkynl group of 1-6 carbons.

1   4.   A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

R_d R_e R_c R_b R_a R_g R_h R_i Z R_k O
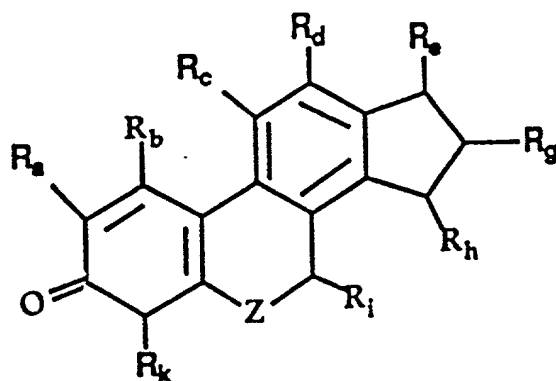
7 wherein:

8 I. R_a–R_k are defined as follows:

A) each R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k

10 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,

11 $-F$, $-NHR_1$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,

12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

13 or

14 B) each R_a, R_b, R_c, R_d, independently is $-R_1$,

15 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, or $-I$

16 and each R_g, R_h, R_i, R_k independently is

17 $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$

18 or $-I$; and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,

19 $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

20 and

21 II. Z is defined as follows:

- 24 -

A) Z is Y, where Y is $-O-$, $-\overset{\displaystyle R_1}{\underset{\displaystyle |}{N}}-$, $>CHR_1$,

$>C=O$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_nOR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}R_2$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}-OR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}HR_2$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}H-OR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}R_2$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}HR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}H-OR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}-OR_2$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-OR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-NH(CH_2)_n-R_2$, $>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}(CH_2)_nNH\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}R_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-NH\overset{\displaystyle O}{\underset{\displaystyle \|}{C}}-OR_2$,

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-NH-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}HR_2$, $>\overset{\displaystyle R}{\underset{\displaystyle |}{C}}-(CH_2)_n-NH-\overset{\displaystyle OH}{\underset{\displaystyle |}{C}}OR_2$, or

$>\overset{\displaystyle R_1}{\underset{\displaystyle |}{C}}-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;

B) Z is $-Y-\underset{\displaystyle R_n}{\underset{\displaystyle |}{CH}}-$ or $-\underset{\displaystyle R_n}{\underset{\displaystyle |}{CH}}-Y-$, where R_n
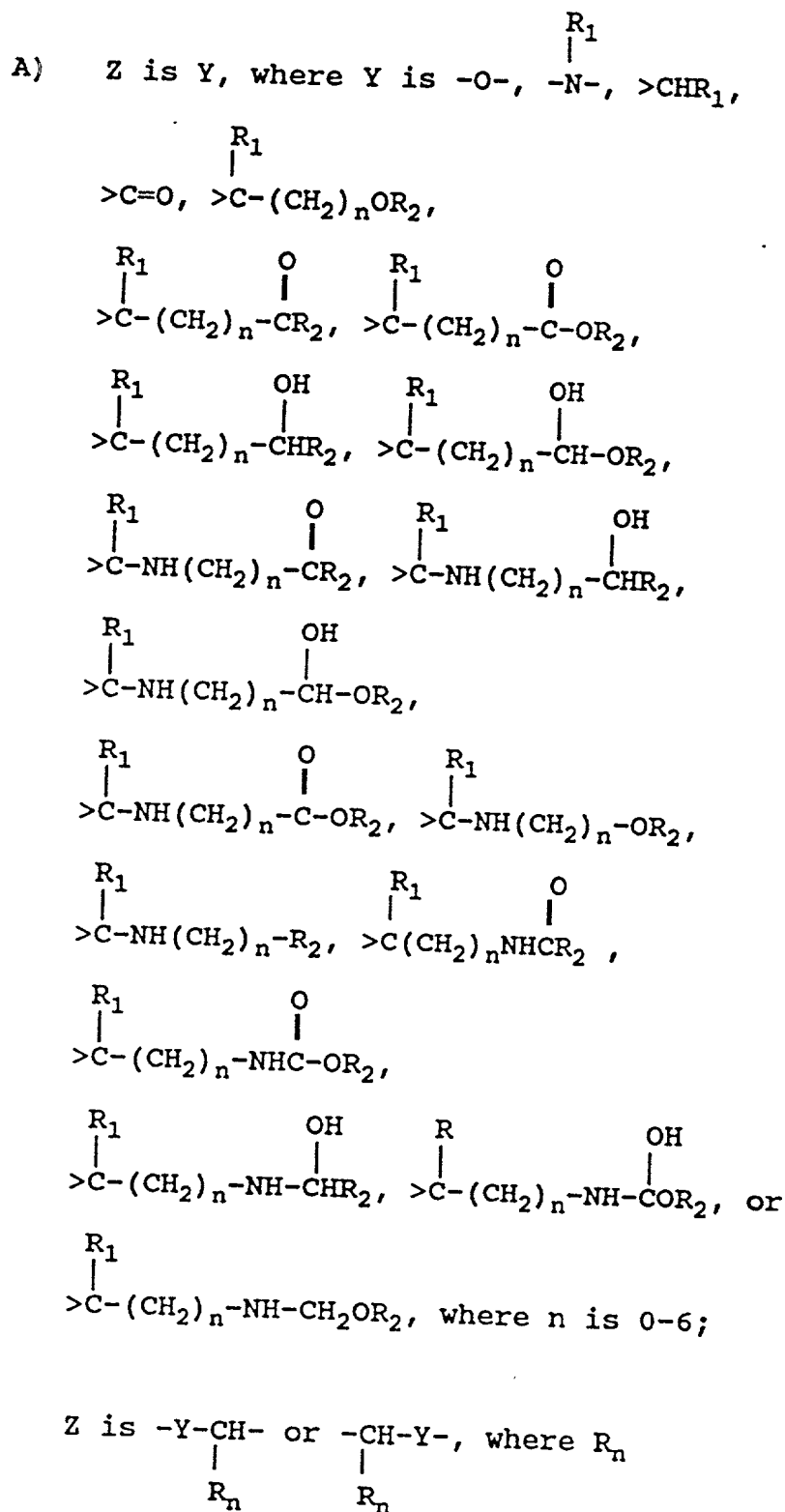
59   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

60 where, in each formula set forth above, each R_1 and R_2

61 independently is $-H$, or substituted or unsubstituted alkyl,

62 alkenyl or alkynl group of 1-6 carbons.

1   5. A method for treating a mammalian disease

2 characterized by abnormal cell mitosis, said method

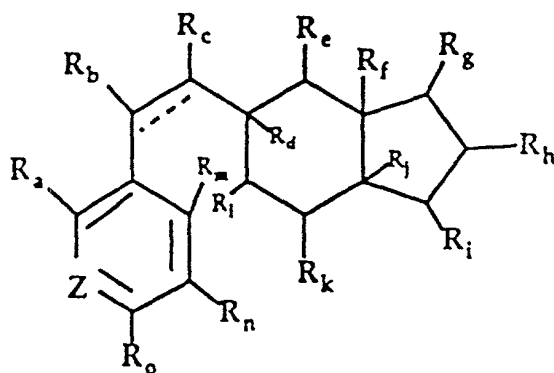3 comprising administering to a mammal a cell-mitosis-

4 inhibiting compound of the formula below, said compound

5 being administered in an amount sufficient to inhibit cell

6 mitosis:

7

8 wherein:

9   I. R_a-R_o are defined as follows:

10   A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_g, R_h, R_j, R_k,

11   R_l, R_m, R_n, R_o independently is $-R_1$, $-OR_1$,

12                     $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i

13   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,

14                     $-I$ or $-C\equiv CH$;

- 26 -

15   or

16   B)   each R_a, R_d, R_f, R_j, R_m, R_n, R_o

17   independently is $-R_1$, $-OR_1$, $-OCR_1$, $-SR_1$,

18                  $-F$, $-NHR_2$, $-Br$, or $-I$; and each R_b, R_c R_e,

19   R_g, R_h, R_k, R_l independently is $=O$,

20                  $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or

21                  $-I$; and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,

22                  $-F$, $-Br$, $-I$ or $-C{\equiv}CH$;

23   or

24   C)   each R_a, R_b, R_c, R_d, R_f, R_j, R_m, R_n, R_o

25   independently is $-R_1$, $-OR_1$, OCR_1, $-SR_1$, $-F$,

26                  $-NHR_2$, $-Br$, $-I$ and each R_e, R_g, R_h, R_k, R_l

27   independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,

28                  $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,

29                  $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, $-I$ or

30                  $-C{\equiv}CH$;

31   II.   Z is defined as follows:

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34   A)   Z is X, where X is $>COR_1$, $>C\overset{\displaystyle O}{\overset{\|}{C}}-R_1$, $>C\overset{\displaystyle O}{\overset{\|}{C}}-OR_1$,

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36                     $>C\overset{\displaystyle OH}{\overset{|}{C}}-R_1$, $>C\overset{\displaystyle OH}{\overset{|}{C}}-OR$;

37

38   or

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41   B)   Z is $=\overset{\underset{\displaystyle R_p}{|}}{C}-X'-$ or $-X'-\overset{\underset{\displaystyle R_p}{|}}{C}=$, where R_p

42   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

43   and X' is X, as defined above;

44   or X' is $>C=O$;

45   where, in each formula set forth above, each R_1 and R_2

46   independently is $-H$, or substituted or unsubstituted alkyl,

47   alkenyl or alkynl group of 1-6 carbons; and the bond

48   indicated by $C\bullet\bullet\bullet C$ is absent or, in combination with the $C-C$

49   bond, is the unit $HC=CH$.

1   6.   A method for treating a mammalian disease

2   characterized by abnormal cell mitosis, said method

3   comprising administering to a mammal a cell-mitosis-

4   inhibiting compound of the formula below, said compound

5   being administered in an amount sufficient to inhibit cell

6   mitosis:

7

- 28 -
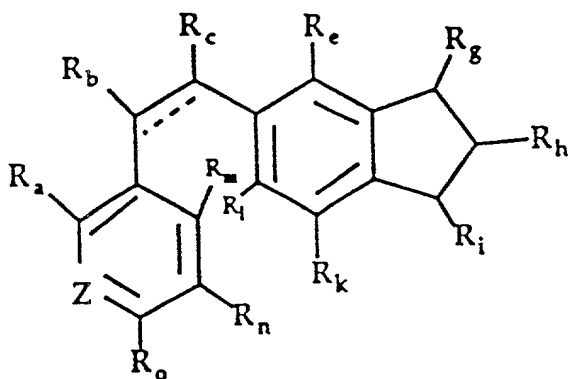
8   wherein:

9   I. R_a-R_o are defined as follows:

10   A)   each R_a, R_b, R_c, R_e, R_g, R_h, R_k, R_l, R_m, R_n,

11   R_o independently is -R_1, -OR_1, -$OCOR_1$,

12   -SR_1, -F, -NHR_2, -Br, or -I; and R_i is -R_1,

13   -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_2, -Br, -I or

14   -C≡CH;

15   or

16   B)   each R_a, R_e, R_l, R_m, R_n, R_o independently

17   is -R_1, -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_2, -Br,

18   -I and each R_b, R_c, R_g, R_h is =O, -R_1,

19   -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br or -I;

20   and R_i is =O, -R_1, -OR_1, -$OCOR_1$, -SR_1, -F,

21   -NHR_1, -Br, -I or -C≡CH;

22   or

23   C)   each R_a, R_b, R_c, R_e, R_k, R_m, R_n, R_o

24   independently is -R_1, -OR_1, -$OCOR_1$, -SR_1,

25   -F, -NHR_2, -Br, -I, and each R_h, R_i

26   independently is =O, -R_1, -OR_1, -$OCOR_1$,

27   -SR_1, -F, -NHR_1, -Br or -I; and R_i is =O,

28   -R_1, -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br, -I

29   or -C≡CH;

30   and

31   I.   Z is defined as follows:

$$>CC\text{-}R_1,\ >CC\text{-}OR_1$$ (with O carbonyl marks)

34   A)   Z is X, where X is >COR_1, >CC-R_1, >CC-OR_1,

35   OH   OH
36 | |
37   >CC-R_1, >CC-OR;

38   or

- 29 -

39
40
41

B)   Z is $=\text{C}-\text{X}'-$ or $-\text{X}'-\text{C}=$, where R_p

$$\underset{R_p}{|} \qquad \underset{R_p}{|}$$

42   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,

43   and X' is X, as defined above;

44   or X' is $=O$;

45   where, in each formula set forth above, each R_1 and R_2

46   independently is $-H$, or substituted or unsubstituted alkyl,

47   alkenyl or alkynl group of 1-6 carbons; and the bond

48   indicated by $C \bullet \bullet \bullet C$ is absent or, in combination with the $C-C$

49   bond is the unit $HC=CH$.

1   7.   A compound of the general formula below, said

2   compound being a cell-mitosis-inhibiting compound:

3
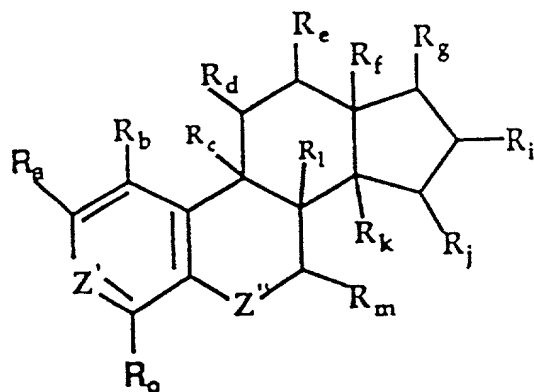
4   wherein:

5   I. R_a-R_o are defined as follows:

6   (A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,

7   R_m, R_o, independently is $-R_1$, $-OR_1$,

8                    $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g

9   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,

10                   $-I$ or $-C{\equiv}CH$;

11   or

12   (B)   each R_a, R_b, R_c, R_f, R_k, R_l, R_o, is $-R_1$,

13                   $-OR_1$, $-OCOR_1$ $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$;

14   and each R_d, R_e, R_i, R_j, R_m, independently

15   is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$,

16                   $-Br$ or $\cdot I$; and R_g is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,

17                   $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C{\equiv}CH$;

18   and

19   II.   Z' is defined as follows:

20
21
22   A)   Z' is X, where X is $>COR_1$, $>\overset{\overset{\displaystyle O}{|}}{C}C\text{-}R_1$,

23
24
25             $>\overset{\overset{\displaystyle O}{|}}{C}C\text{-}OR_1$, $>\overset{\overset{\displaystyle OH}{|}}{C}C\text{-}R_1$, $>\overset{\overset{\displaystyle OH}{|}}{C}C\text{-}OR_1$;

26   or

27   B)   Z' is $=C\text{-}X'\text{-}$ or $-X'\text{-}C=$, where R_n
28                         $\underset{\overset{|}{R_n}}{}$ $\underset{\overset{|}{R_n}}{}$
29

30   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

31   or X' is X, as defined above; or
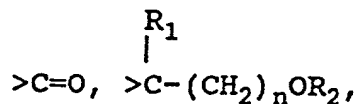
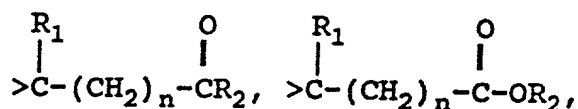32   X' is $>C=O$;

33   and

34   III. Z" is defined as follows:

35
36
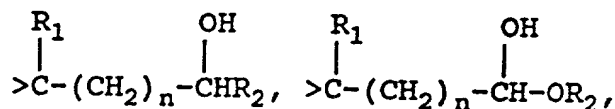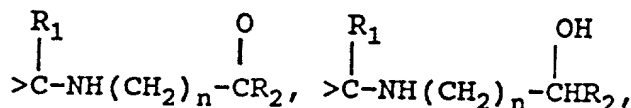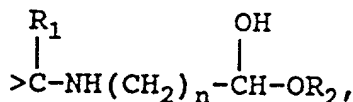37   A)   Z" is Y, where Y is -O-, -N-, $>CHR_1$,
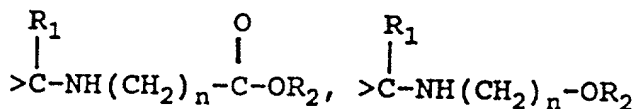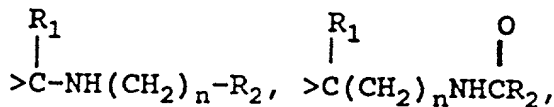
with R_1 above -N-

38
39          $>C=O$, $>\overset{R_1}{C}-(CH_2)_nOR_2$,
40

41
42          $>\overset{R_1}{C}-(CH_2)_n-\overset{O}{C}R_2$, $>\overset{R_1}{C}-(CH_2)_n-\overset{O}{C}-OR_2$,
43

44
45          $>\overset{R_1}{C}-(CH_2)_n-\overset{OH}{C}HR_2$, $>\overset{R_1}{C}-(CH_2)_n-\overset{OH}{C}H-OR_2$,
46

47
48          $>\overset{R_1}{C}-NH(CH_2)_n-\overset{O}{C}R_2$, $>\overset{R_1}{C}-NH(CH_2)_n-\overset{OH}{C}HR_2$,
49

50
51          $>\overset{R_1}{C}-NH(CH_2)_n-\overset{OH}{C}H-OR_2$,
52

53
54          $>\overset{R_1}{C}-NH(CH_2)_n-\overset{O}{C}-OR_2$, $>\overset{R_1}{C}-NH(CH_2)_n-OR_2$
55

56
57          $>\overset{R_1}{C}-NH(CH_2)_n-R_2$, $>\overset{R_1}{C}(CH_2)_n\overset{O}{N}HCR_2$,
58

59
60          $>\overset{R_1}{C}-(CH_2)_n-\overset{O}{N}HC-OR_2$,
61

62
63          $>\overset{R_1}{C}-(CH_2)_n-NH-\overset{OH}{C}HR_2$, $>\overset{R}{C}-(CH_2)_n-NH-\overset{OH}{C}OR_2$, or
64

65
66          $>\overset{R_1}{C}-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;
67

68   or

69   B)   Z" is $-Y-\overset{}{C}H-$ or $-\overset{}{C}H-Y-$ where R_p
70 | |
71   R_p R_p

                              - 32 -
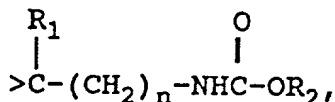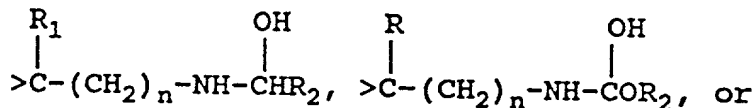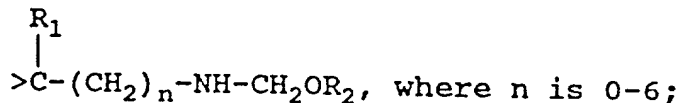
72   is $-R_1, -OR_1, -SR_1, -F, -NHR_2, -Br$ or $-I$;

73   provided that when:

74   3)   each $R_b, R_c, R_d, R_e, R_j R_k, R_l, R_m,$ is $-H$;

75   R_f is $-CH_3$;

76
77
78   R_g is $-OH, -O\overset{\text{O}}{\overset{\|}{C}}CH_3$;

79   R_i is $-H, -OH,$ or $=O$;

80   R_o is $-H$ or $-Br$;

81   Z' is $>COH$; and

82   Z'' is $>CH_2$ or $-OH$; then

83   R_a is not $-F, -Br, -OH$ or $-H$;

84   and

85   4)   each $R_b, R_c, R_d, R_e, R_i, R_j R_k, R_l,$

86                   $R_m,$ is $-H$;

87   R_f is $-CH_3$;

88   R_g is $-OH$; and

89   Z'' is $>CH_2$; then

90
91
92   Z' is not $>COCH_3$ or $>CO\overset{\text{O}}{\overset{\|}{C}}CH_3$; and

93   each R_a, R_o independently or together are

94   not $-OCH_3$ or $-H$;

95   and

96   5)   each $R_c, R_e, R_j, R_k, R_l, R_m, R_o$ is $-H$;

97   R_a is $-H$ or $-OCH_3$;

98   R_b is $-H$ or $-CH_3$;

99   R_d is $-OH$;

100   R_f is $-CH_3$;

101   R_g is $=O$;

102   R_i is $-OH, =O$ or $-C{\equiv}CH$; and

103   Z'' is $>CH_2$; then

104
105
106   Z' is not $>COH; >CO\overset{\text{O}}{\overset{\|}{C}}CH_3,$ or $-H$;

107 where, in each formula set forth above, each R_1 and R_2
108 independently is -H, or substituted or unsubstituted alkyl,
·109 alkenyl or alkynl group of 1-6 carbons.

1   8.   A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3
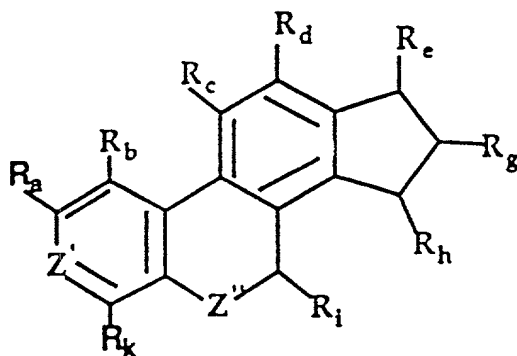
4 wherein:
5   I. R_a-R_k are defined as follows:
6   A)   each R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k
7   independently is -R_1, -OR_1, -$OCOR_1$, -SR_1,
8   -F, -NHR_2, -Br, or -I; and R_e is -R_1, -OR_1,
9   -$OCOR_1$, -SR_1, -F, -NHR_2, -Br, -I or -C≡CH;
10 or
11   B)   each R_a, R_b, R_c, R_d, R_k, is -R_1, -OR_1,
12   -$OCOR_1$, -SR_1, -F, -NHR_2, -Br, or -I; and
13   each R_g, R_h, R_i, independently is =O,

14                     $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, or $-I$;

15   and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$,
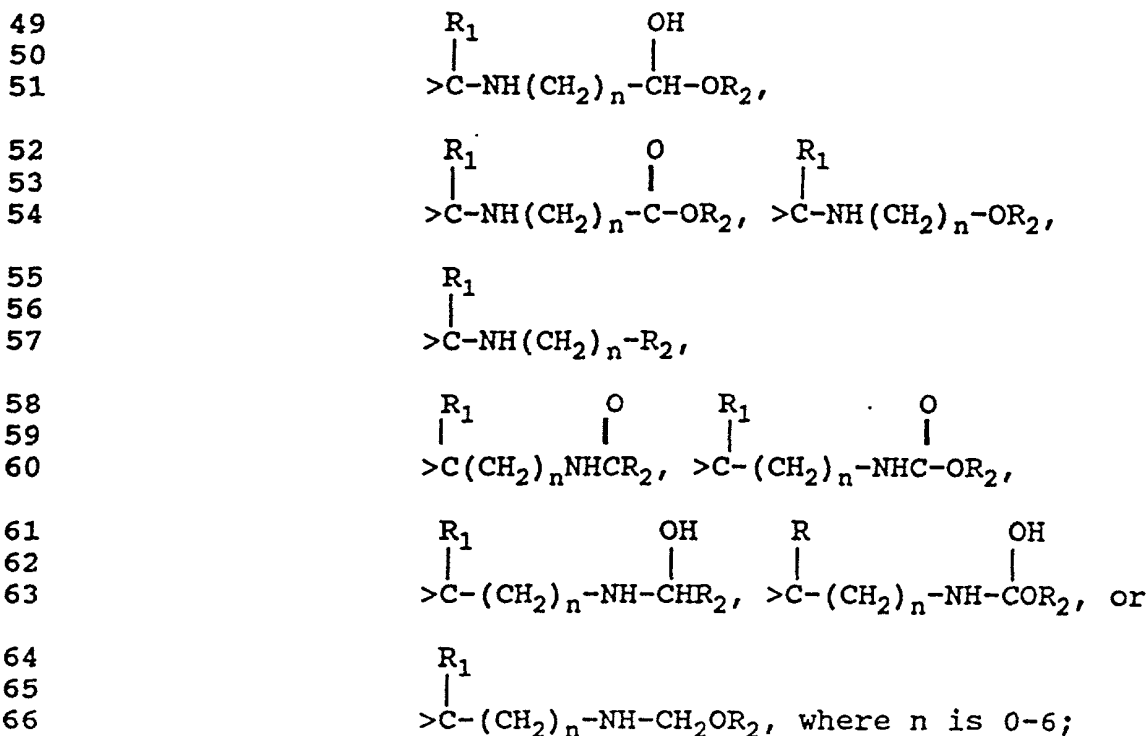
16                     $-Br$, $-I$ or $-C{\equiv}CH$;

17 and

18   I.   Z' is defined as follows:

19
20
21   A)   Z' is X, where X is $>COR_1$, $>C_2\overset{\displaystyle O}{\overset{\|}{C}}-R_1$,

22
23
24               $>C_2\overset{\displaystyle O}{\overset{\|}{C}}-OR_1$, $>C\overset{\displaystyle OH}{\overset{\|}{C}}-R_1$, $>C-\overset{\displaystyle OH}{\overset{\|}{C}}-OR_1$;

25 or

26   B)   Z' is $=C-X'-$ or $-X'-C=$, where R_n
27                           $|$ $|$
28   R_n R_n

29   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,

30   and X' is X, as defined above;

31   or X' is also $>C=0$;

32 and

33   II.   Z" is defined as follows:

34
35
36   A)   Z" is Y, where Y is $-O-$, $-N-$, $>CHR_1$, with substituent R_1 on the N,

37
38
39            $>C=0$, $>\overset{\displaystyle R_1}{\overset{|}{C}}-(CH_2)_nOR_2$,

40
41
42          $>\overset{\displaystyle R_1}{\overset{|}{C}}-(CH_2)_n-\overset{\displaystyle O}{\overset{\|}{C}}R_2$, $>\overset{\displaystyle R_1}{\overset{|}{C}}-(CH_2)_n-\overset{\displaystyle O}{\overset{\|}{C}}-OR_2$,

43
44
45          $>\overset{\displaystyle R_1}{\overset{|}{C}}-(CH_2)_n-\overset{\displaystyle OH}{\overset{|}{C}}HR_2$, $>\overset{\displaystyle R_1}{\overset{|}{C}}-(CH_2)_n-\overset{\displaystyle OH}{\overset{|}{C}}H-OR_2$,

46
47
48          $>\overset{\displaystyle R_1}{\overset{|}{C}}-NH(CH_2)_n-\overset{\displaystyle O}{\overset{\|}{C}}R_2$, $>\overset{\displaystyle R_1}{\overset{|}{C}}-NH(CH_2)_n-\overset{\displaystyle OH}{\overset{|}{C}}HR_2$,

49
50
51

$$>C-NH(CH_2)_n-\underset{\underset{R_1}{|}}{C}H-OR_2,$$

with R_1 on left carbon and OH above the CH:

$$>\underset{\underset{R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{OH}{|}}{C}H-OR_2,$$

52
53
54

$$>\underset{\underset{R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{O}{\|}}{C}-OR_2, \quad >\underset{\underset{R_1}{|}}{C}-NH(CH_2)_n-OR_2,$$

55
56
57

$$>\underset{\underset{R_1}{|}}{C}-NH(CH_2)_n-R_2,$$

58
59
60

$$>\underset{\underset{R_1}{|}}{C}(CH_2)_n NH\overset{\overset{O}{\|}}{C}R_2, \quad >\underset{\underset{R_1}{|}}{C}-(CH_2)_n-NH\overset{\overset{O}{\|}}{C}-OR_2,$$

61
62
63

$$>\underset{\underset{R_1}{|}}{C}-(CH_2)_n-NH-\overset{\overset{OH}{|}}{C}HR_2, \quad >\underset{\underset{R}{|}}{C}-(CH_2)_n-NH-\overset{\overset{OH}{|}}{C}OR_2, \text{ or}$$

64
65
66

$$>\underset{\underset{R_1}{|}}{C}-(CH_2)_n-NH-CH_2OR_2, \text{ where } n \text{ is } 0-6;$$

67   or

68   B)   Z" is $-Y-\underset{\underset{R_p}{|}}{C}H-$ or $-\underset{\underset{R_p}{|}}{C}H-Y-$, where R_p is
69
70

71       $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

72   where, in each formula set forth above, each R_1 and R_2

73   independently is $-H$, or substituted or unsubstituted alkyl,

74   alkenyl or alkynl group of 1-6 carbons.

1   9.   A compound of the general formula below, said

2   compound being a cell-mitosis-inhibiting compound:
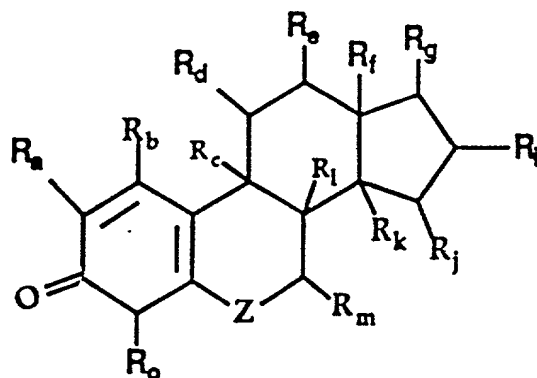
3 wherein:

4 I. R_a-R_o are defined as follows:

5   A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,
6   R_m, R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
7    $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $-R_1$,
8    $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
9    $-C{\equiv}CH$;

10 or

11   B)   each R_a, R_b, R_c, R_f, R_k, R_l, independently
12   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
13   or $-I$; and each R_d, R_e, R_i, R_j, R_m, R_o
14   independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
15    $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and R_g is $=O$,
16    $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$
17   or $-C{\equiv}CH$;

18 and

19 II. Z is defined as follows:

20
21
22   A)   Z is Y, where Y is $-O-$, $-\overset{\displaystyle R_1}{\underset{|}{N}}-$, $>CHR_1$,
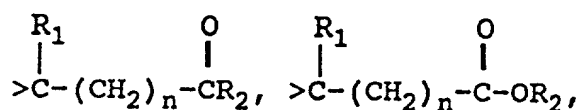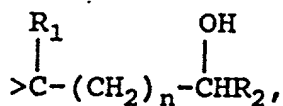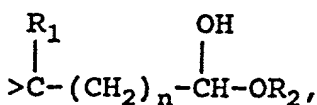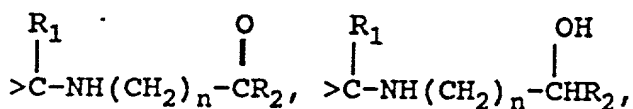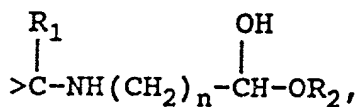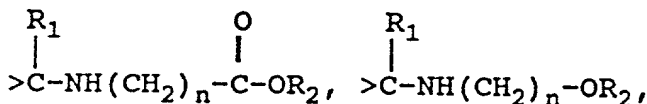
23
24
25    $>C=O$, $>\overset{\displaystyle R_1}{\underset{|}{C}}-(CH_2)_nOR_2$,

- 37 -

26
27
28

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-\overset{\underset{\displaystyle}{O}}{C}R_2, \quad >\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-\overset{\underset{\displaystyle}{O}}{C}-OR_2,$$

29
30
31

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-\overset{\underset{\displaystyle |}{OH}}{C}HR_2,$$
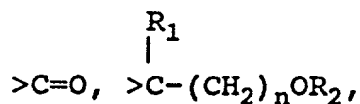
32
33
34

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-\overset{\underset{\displaystyle |}{OH}}{C}H-OR_2,$$

35
36
37

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-\overset{\underset{\displaystyle}{O}}{C}R_2, \quad >\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-\overset{\underset{\displaystyle |}{OH}}{C}HR_2,$$

38
39
40

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-\overset{\underset{\displaystyle |}{OH}}{C}H-OR_2,$$

41
42
43

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-\overset{\underset{\displaystyle}{O}}{C}-OR_2, \quad >\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-OR_2,$$

44
45
46

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-NH(CH_2)_n-R_2,$$

47
48
49
50

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-NH\overset{\underset{\displaystyle}{O}}{C}-OR_2, \quad >\overset{\underset{\displaystyle |}{R_1}}{C}(CH_2)_nNH\overset{\underset{\displaystyle}{O}}{C}R_2,$$

51
52
53

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-NH-\overset{\underset{\displaystyle |}{OH}}{C}HR_2, \quad >\overset{\underset{\displaystyle |}{R}}{C}-(CH_2)_n-NH-\overset{\underset{\displaystyle |}{OH}}{C}OR_2, \text{ or}$$

54
55
56

$$>\overset{\underset{\displaystyle |}{R_1}}{C}-(CH_2)_n-NH-CH_2OR_2, \text{ where } n \text{ is } 0\text{-}6;$$

57   or

58   B)   Z is $-Y-\overset{\underset{\displaystyle |}{}}{CH}-$ or $-\overset{\underset{\displaystyle |}{}}{CH}-Y-$, where R_n
59                  $\quad\quad\quad\quad R_n\quad\quad\quad R_n$
60
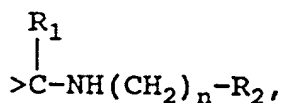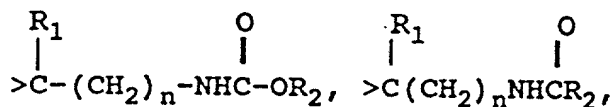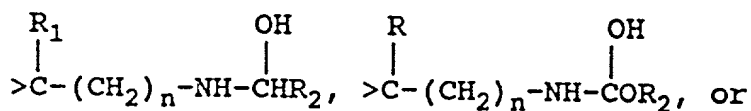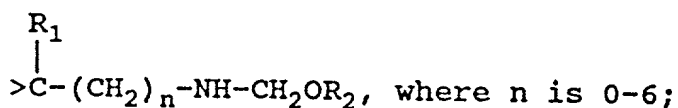
61   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

- 38 -

62 where, in each formula set forth above, each R_1 and R_2

63 independently is -H, or substituted or unsubstituted alkyl,

· 64 alkenyl or alkynl group of 1-6 carbons.

1   10. A compound of the general formula below, said

2 compound being a cell-mitosis-inhibiting compound:

3
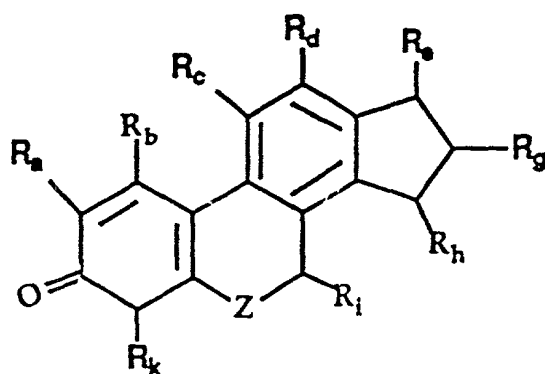
4 wherein:

5   I. R_a-R_k are defined as follows:

6   A)   each R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k

7   independently is -R_1, -OR_1, -$OCOR_1$, -SR_1,

8   -F, -NHR_1, -Br, or -I; and R_e is -R_1, -OR_1,

9   -$OCOR_1$, -SR_1, -F, -NHR_1, -Br, -I or -C≡CH;

10 or

11   B)   each R_a, R_b, R_c, R_d, independently is -R_1,

12   -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br, or -I;

13   and each R_g, R_h, R_i, R_k independently is

14   =O, -R_1, -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br

15   or -I; and R_e is -R_1, -OR_1, -$OCOR_1$, -SR_1,

16   -F, -NHR_1, -Br, -I or -C≡CH;
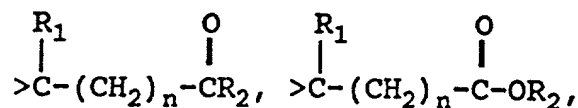
17   II.   Z is defined as follows:

- 39 -

1) Z is Y, where Y is $-O-$, $-N-$, $>CHR_1$,

$$>C=O, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_nOR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}HR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle OH}{|}}{C}H-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OR_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-NH(CH_2)_n-R_2, \quad >\overset{\overset{\displaystyle R_1}{|}}{C}(CH_2)_nNH\overset{\overset{\displaystyle O}{\|}}{C}R_2$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH\overset{\overset{\displaystyle O}{\|}}{C}-OR_2,$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH-\overset{\overset{\displaystyle OH}{|}}{C}HR_2, \quad >\overset{\overset{\displaystyle R}{|}}{C}-(CH_2)_n-NH-\overset{\overset{\displaystyle OH}{|}}{C}OR_2, \text{ or}$$

$$>\overset{\overset{\displaystyle R_1}{|}}{C}-(CH_2)_n-NH-CH_2OR_2, \text{ where } n \text{ is } 0\text{-}6;$$
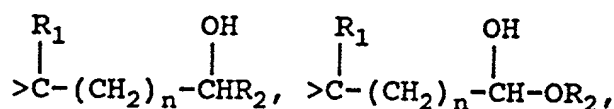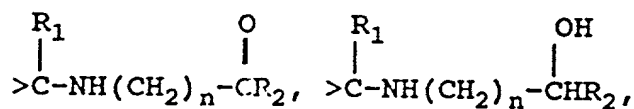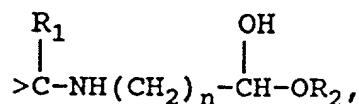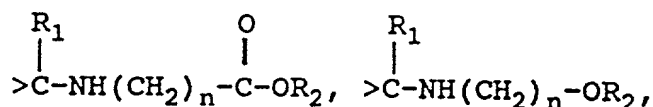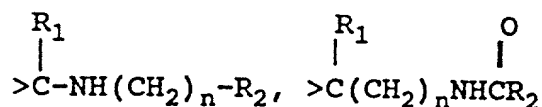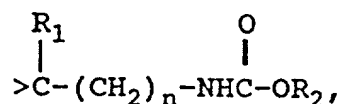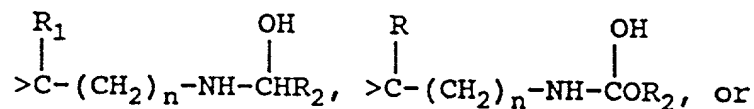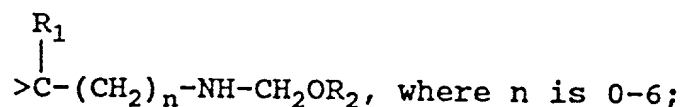
or

```
52        Z is -Y-CH- or -CH-Y-, where $R_n$
53              |           |
54             $R_n$       $R_n$
```

```
55        is $-R_1$, $-OR_1$, $-SR_1$, -F,
56        $-NHR_2$, -Br or -I;
```

57 where, in each formula set forth above, each R_1 and R_2
58 independently is -H, or substituted or unsubstituted alkyl,
59 alkenyl or alkynl group of 1-6 carbons.

1   11. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3
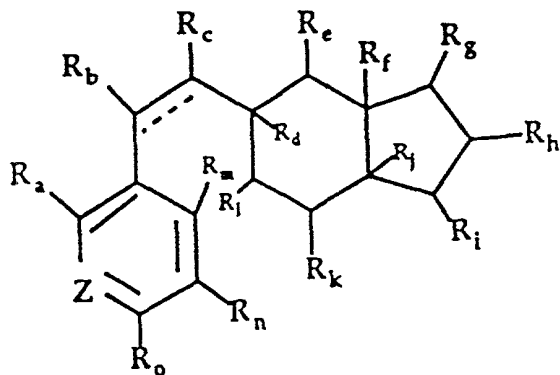
4 wherein:

5   I. R_a-R_o are defined as follows:

6   A)   each R_a, R_b, R_c, R_d, R_e, R_f, R_g, R_h, R_j, R_k,
7   R_l, R_m, R_n, R_o independently is $-R_1$, $-OR_1$,
8                 $-OCOR_1$, $-SR_1$, -F, $-NHR_2$, -Br, or -I; and R_i
9   is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, -F, $-NHR_2$, -Br,
10   -I or $-C{\equiv}CH$;

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11   or

12   B)   each R_a, R_d, R_f, R_j, R_m, R_n, R_o

13   independently is $-R_1$, $-OR_1$, $-OCR_1$, $-SR_1$,

14                   $-F$, $-NHR_2$, $-Br$, $-I$; and each R_b, R_c, R_e,

15   R_g, R_h, R_k, R_l independently is $=O$, $-R_1$,

16                   $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$;

17   and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$,

18                   $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;

19   or

20   C)   each R_a, R_b, R_c, R_d, R_f, R_j, R_m, R_n, R_o

21   independently is $-R_1$, $-OR_1$, OCR_1, $-SR_1$, $-F$,

22                   $-NHR_2$, $-Br$, $-I$; and each R_e, R_g, R_h, R_k, R_l

23   independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,

24                   $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,

25                   $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$

26   or $-C\equiv CH$;

27   and

28   I.   Z is defined as follows:

29
30
31   1)   Z is X, where X is $>COR_1$, $>\overset{\text{O}}{\overset{\|}{C}}C\text{-}R_1$, $>\overset{\text{O}}{\overset{\|}{C}}C\text{-}OR_1$,

32
33                   $>\overset{\text{OH}}{\overset{\|}{C}}C\text{-}R_1$, $>\overset{\text{OH}}{\overset{\|}{C}}C\text{-}OR$; or

34

35   Z is $=C-X'-$ or $-X'-C=$, where R_p

36

37   R_p R_p

38   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

39   and X' is X, as defined above;

40   or X' is $>C=O$;

41 where, in each formula set forth above, each R_1 and R_2

42 independently is $-H$, or substituted or unsubstituted alkyl,

43 alkenyl or alkynl group of 1-6 carbons; and the bond

44 indicated by $C\bullet\bullet\bullet C$ is absent or, in combination with the $C-C$

45 bond is the unit $HC=CH$.

1   12. A compound of the general formula below, said

2 compound being a cell-mitosis-inhibiting compound:

3
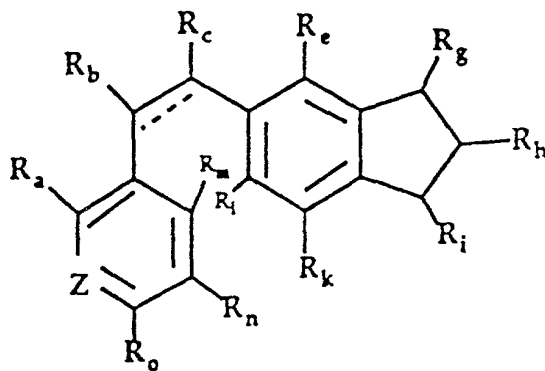
4 wherein:

5   I. R_a-R_o are defined as follows:

6   A)   each R_a, R_b, R_c, R_e, R_g, R_h, R_k, R_l, R_m, R_n,

7   R_o independently is -R_1, -OR_1, $OCOR_1$, -SR_1,

8   -F, -NHR_2, -Br, or -I; and R_i is -R_1, -OR_1,

9   -$OCOR_1$, -SR_1, -F, -NHR_2, -Br, -I or -C≡CH;

10 or

11   B)   each R_a, R_e, R_l, R_m, R_n, R_o independently

12   is -R_1, -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_2, -Br,

13   -I; and each R_b, R_c, R_g, R_h is =O, -R_1,

14   -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br or -I;

15   and R_i is =O, -R_1, -OR_1, -$OCOR_1$, -SR_1, -F,

16   -NHR_1, -Br, -I or -C≡CH;

17 or

18   C)   each R_a, R_b, R_c, R_e, R_k, R_m, R_n, R_o

19   independently is -R_1, -OR_1, $OCOR_1$, -SR_1,

20   -F, -NHR_2, -Br, -I; and each R_g, R_h

21   independently is =O, -R_1, -OR_1, -$OCOR_1$,

22   -SR_1, -F, -NHR_1, -Br or -I; and R_i is =O,

23   -R_1, -OR_1, -$OCOR_1$, -SR_1, -F, -NHR_1, -Br, -I

24   or -C≡CH;

25 and

26   II.   Z is defined as follows:

27

28

29   A)   Z is X, where X is >COR_1, >$\overset{\overset{O}{\|}}{C}C\text{-}R_1$, >$\overset{\overset{O}{\|}}{C}C\text{-}OR_1$,

30
31   >$\overset{\overset{OH}{|}}{C}C\text{-}R_1$, >$\overset{\overset{OH}{|}}{C}C\text{-}OR$;
32

33 or

34   B)   Z is =$\overset{|}{\underset{R_p}{C}}$-X'- or -X'-$\overset{|}{\underset{R_p}{C}}$=, where R_p
35
36

- 44 -

37   is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,

38   and X' is X, as defined above;

39   or X' is $=O$;

40 where, in each formula set forth above, each R_1 and R_2

41 independently is $-H$, or substituted or unsubstituted alkyl,

42 alkenyl or alkynl group of 1-6 carbons; and the bond

43 indicated by C•••C is absent or, in combination with the C—C

44 bond is the unit HC≡CH.

1   13.   The method of claim 1, wherein said

2 cell-mitosis-inhibiting composition is 2-methoxyestradiol.

1   14.   The method of claim 1, wherein said

2 cell-mitosis-inhibiting composition is 2-fluoroestradiol.

1   15.   The method of claim 1, wherein said

2 cell-mitosis-inhibiting composition is 2-bromoestradiol.

1   16.   The method of claim 1, wherein said

2 cell-mitosis-inhibiting composition is 2-methoxyestrone.

1   17.   The method of claim 1, wherein said cell-

2 mitosis-inhibiting composition is 17-ethynylestradiol.

1   18.   The method of claims 1 or 2 wherein said

2 compound is further characterized in that

3   A)   Z' is $=\overset{|}{C}-X'-$ or $-X'-\overset{|}{C}=$; and

4 | |

5   R_n R_n

6   Z" is $-Y-\overset{|}{C}H-$ or $-\overset{|}{C}H-Y-$; or

7 | |

8   R_p R_p

9   B)   Z' is X; and Z" is $-Y-\overset{|}{C}H-$ or $-\overset{|}{C}H-Y-$; or

10 | |

11 R_p R_p

C)   Z' is $=\overset{\underset{\displaystyle R_n}{|}}{C}-X'-$ or $-X'-\overset{\underset{\displaystyle R_n}{|}}{C}=$; and Z" is Y.

19.   The method of claims 3 or 4 wherein said compound is further characterized in that Z is $-Y-\overset{\underset{\displaystyle R_n}{|}}{C}H-$ or $-\overset{\underset{\displaystyle R_n}{|}}{C}H-Y-$.

20.   The method of claims 5 or 6 wherein said compound is further characterized in that Z is $=\overset{\underset{\displaystyle R_p}{|}}{C}-X'-$ or $-X'-\overset{\underset{\displaystyle R_p}{|}}{C}=$.

21.   The compound of claims 7 or 8, wherein said compound is further characterized in that

A)   Z' is $=\overset{\underset{\displaystyle R_n}{|}}{C}-X'-$ or $-X'-\overset{\underset{\displaystyle R_n}{|}}{C}=$; and

Z" is $-Y-\overset{\underset{\displaystyle R_p}{|}}{C}H-$ or $-\overset{\underset{\displaystyle R_p}{|}}{C}H-Y-$; or

B)   Z' is X; and Z" is $-Y-\overset{\underset{\displaystyle R_p}{|}}{C}H-$ or $-\overset{\underset{\displaystyle R_p}{|}}{C}H-Y-$; or

C)   Z' is $=\overset{\underset{\displaystyle R_n}{|}}{C}-X'-$ or $-X'-\overset{\underset{\displaystyle R_n}{|}}{C}=$; and Z" is Y.

22.   The compound of claims 9 or 10, wherein said compound is further characterized in that Z is $-Y-\overset{\underset{\displaystyle R_n}{|}}{C}H-$ or $-\overset{\underset{\displaystyle R_n}{|}}{C}H-Y-$.

1   23.   The compound of claims 11 or 12, wherein said
2 compound is further characterized in that Z is
3 $=C-X'-$ or $-X'-C=$.
4 | |
5   R_p R_p
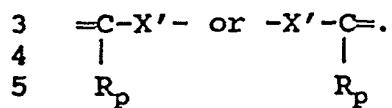
1   24.   The method of any one of claims 1-6, wherein at
2 least one of $R_a \rightarrow R_p$ is $-OCH_3$.

1   25.   The compound of any one of claims 7-12, wherein
2 at least one of $R_a \rightarrow R_p$ is $-OCH_3$.